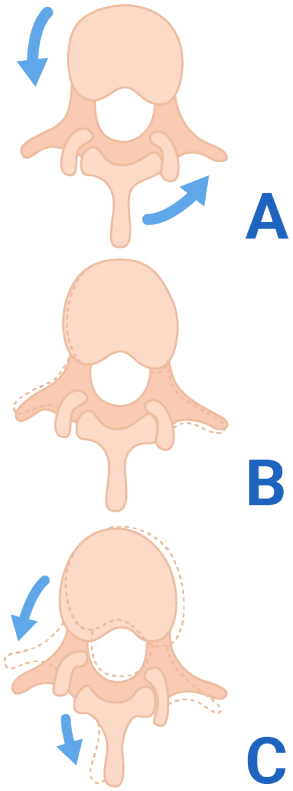
Understanding Rotational Listhesis



Left axial rotation of normal lumbar intervertebral joint

A. Initially rotation occurs about the an axis in the vertebral body
B. As posterior elements swing around, the right inferior articular process of upper vertebra impacts the superior articular process of lower vertebra. The opposite Z joint is then gapped.
C. Rotation over 3 degrees occurs about an axis located in the impacted Z-joint. The IVD must undergo a lateral shear and the opposite Z-joint is gapped and distracted posteriorly.

Clinical Anatomy of the Lumbar Spine, N. Boduk and L. Twomey

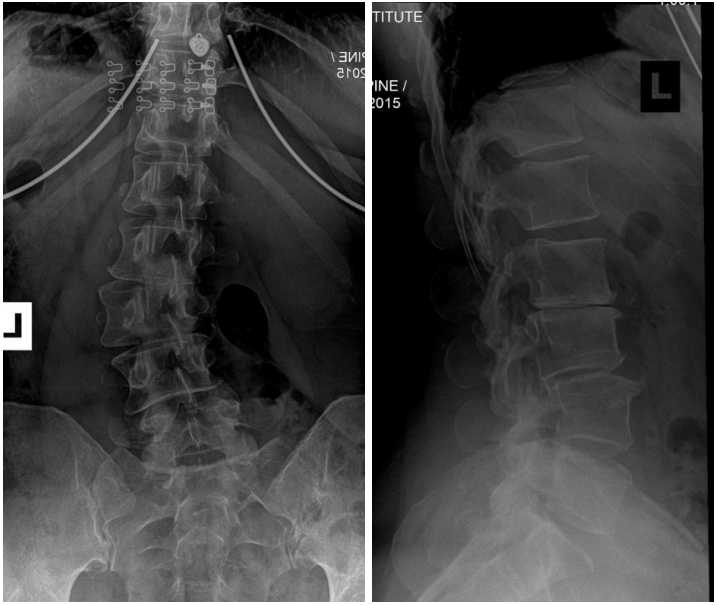
Understanding Rotational Listhesis (cont.)

- Axial rotation of 0 degrees to 3 degrees produces no micro-injury in the 'annulus' of the intervertebral disc or excess compression in the Z joints
- Axial rotation over 3 degrees implies risk of micro-injury
- Axial Rotation over 13 degrees: macro-failure from torsional stress in the IVD
- **Therefore, range between 3 degrees and 12 degrees represents continuum between micro-failure to overt failure**

Clinical Anatomy of the Lumbar Spine, N. Boduk and L. Twomey

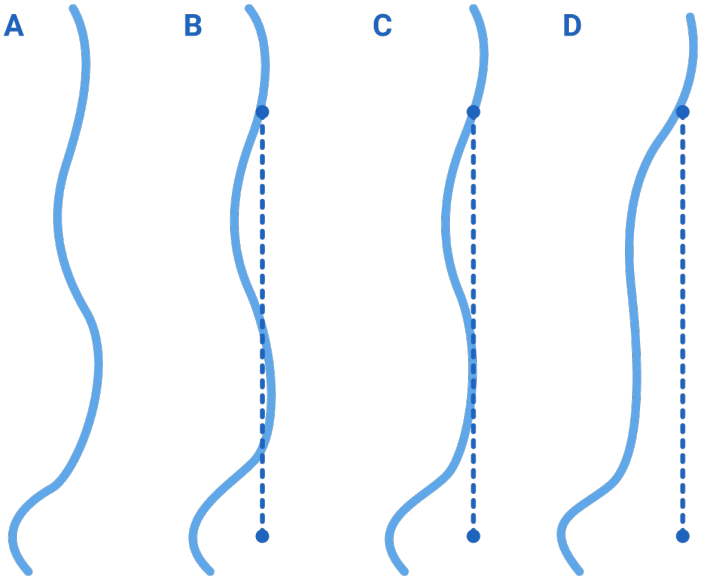
Adult Case: Example of Modifiers

- Rotational listhesis
- Lateral listhesis
- Degenerative disc
- Anterior listhesis
- Loss of lumbar lordosis



Physical Therapy Guidelines for Adults

- "There is a detrimental association of positive sagittal balance on ODI in adult spinal deformity"
- **PT treatment application:** achieving adequate sagittal balance in the management of adult spinal deformity especially in patients older than 50-year-old with degenerative scoliosis



Mac-Thiong et al. Can C7 plumbline and gravity line predict health related QOL in AS? Spine 2009 July 1;34(15):E519-27.

Physical Therapy Guidelines for Adults (cont.)

- **Sagittal/Coronal C7 Plumb and AS QOL-purpose:** to assess the influence of sagittal and coronal balance on HRQOL in adult scoliosis
- **Design:** prospective
- **Method:** N=73 consecutive new non-operated adults evaluated over one year using; x-ray/gravity plates, ODI and HRQOL assessment tool and C7 Plumb line

Mac-Thiong et al. Can C7 plumbline and gravity line predict health related QOL in AS? Spine 2009 July 1;34(15):E519-27.

Physical Therapy Guidelines for Adults (cont.)

- **Sagittal/Coronal C7 Plumb and AS QOL results:** a poor ODI (over 34) was associated with
  1. Sagittal C7 plumb line greater than 6 cm
  2. Sagittal gravity line greater than 6 cm
  3. C7 plumb line in front of the gravity line
     - Correlations between coronal balance and ODI were not statistically significant
- **Conclusion:** sagittal spinal balance and global balance
  - **Both** are strongly related to the Oswestry Disability index (ODI) in adults with scoliosis

Mac-Thiong et al. Can C7 plumbline and gravity line predict health related QOL in AS? Spine 2009 July 1;34(15):E519-27.

Adults: Symptoms and Complexities

Group I:
Adults w/ adolescent onset (AIS)

Group II:
Adults w/ adult onset (AS)

no pain
pain (spinal)
pain (spinal + neuro)
pain + degeneration
pain + degeneration + uni-plane listhesis
pain + degeneration + multi-plane listhesis
pain + degeneration + (listhesis) + junctional curve

Rigo, Manuel, MD "Differential Diagnosis of Back Pain in Adult Scoliosis – Non-operative" Scoliosis Journal 2010, 5 (Suppl 1):044

Adults: Symptoms and Complexities
(cont.)

- Pain is **multifactorial**. We need to evaluate, what and how we are assessing for adults with scoliosis including.
  1. **Self report** of pain and disability
  2. **Clinical evaluation**
  3. **Radiological parameters**
- In order to establish: differential diagnosis, prognosis and specific evidence based treatment

Rigo, Manuel, MD "Differential Diagnosis of Back Pain in Adult Scoliosis – Non-operative" Scoliosis Journal 2010, 5 (Suppl 1):044

Adult Research Summary

- Cannot predict QOL for adults with scoliosis based upon their pre-adult status: Cobb severity does not predict QOL for adults
- Some adults with AIS do well in life, and some do not: both groups have a mixture of characteristics
- But in those adults with QOL problems: it is due to pain more than scoliosis deformity itself
- We cannot say to an adolescent: you have a 60 degree curve and will have pain as an adult or you have a 20 degree curve and will not have pain

Rigo, Manuel, MD "Differential Diagnosis of Back Pain in Adult Scoliosis – Non-operative" Scoliosis Journal 2010, 5 (Suppl 1):044

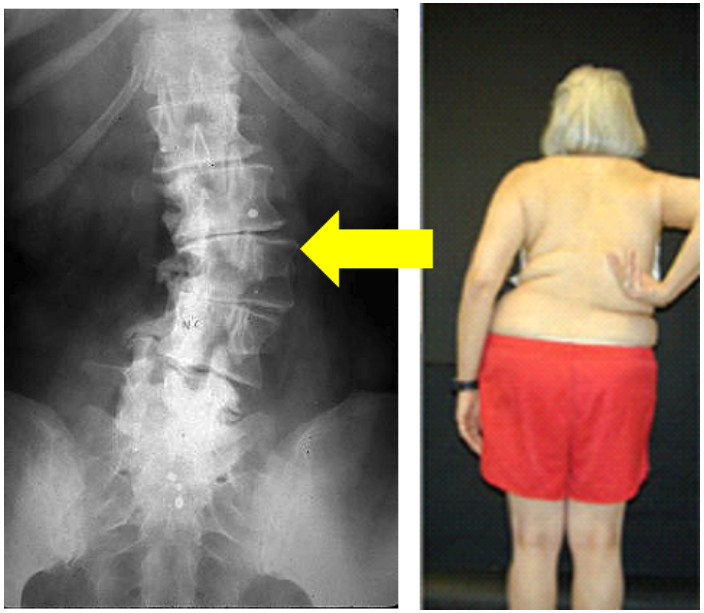
Radiology and Clinical Together

- Pain and disability: patient was asked, “Where is your pain?”
- She points to the concavity of lumbosacral fractional curve
- Pain cause? Likely due to modifiers.
  - Degenerative facets
  - Endplate changes
  - Listhesis
- Note: not a big Cobb

Boachie-Adjei. Musculoskeletal J HSS. 2011.

Radiology and Clinical Together (cont.)

- Pain and disability: patient was asked, “Where is your pain?”
- She points to the apex/ convexity of lumbar/thoracolumbar curve
- More likely due to over-active muscle contraction at the apex



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